SCIENCE

NEW YORK, AUGUST 7, 1891.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

By invitation of the several scientific associations in Washington, the fortieth meeting of the American Association for the Advancement of Science will be held in the city of Washington, beginning with the council meeting on Monday, Aug. 17. As there will be meetings of several affiliated societies about the time of the association meeting, and as the International Congress of Geologists will hold its first meeting in this country during the last week in August, the official time given for the association meeting will be from Aug. 17 to Sept. 2. This will allow members of the association to unite with and attend the meetings of the other societies.

The hotel headquarters of the association will be the Arlington, near the buildings of Columbian University (corner of 15th and H Streets, N.W.), in which will be the offices, the hall for general sessions, and the rooms for the several sections.

For information relating to membership and papers, address F. W. Putnam, Permanent Secretary, Salem, Mass. For all matters relating to local arrangements, hotels, railway rates, and certificates, address Mr. Marcus Baker, Local Secretary, United States Geological Survey, Washington.

Abstracts of papers, and nominations of members and fellows, should be mailed to the Permanent Secretary, Salem, Mass., until Aug. 10: after that date his address will be the Arlington, Washington.

All botanists, members of the association, are requested to register at Room 22 as soon as practicable after their arrival. The ordinary meetings of the Botanical Club of the association will be held in Room 22, on Thursday, Friday, and Saturday, at 9 o'clock A.M. Mr. Wm. M. Canby, Wilmington, Del., president; Mr. B. T. Galloway, Washington, D.C., secretary.

The Entomological Club will meet daily at 9 A.M., in Room 15. All entomologists, members of the association, are requested to register in Room 15, as soon as possible after their arrival. Professor Herbert Osborn, Ames, Iowa, president; Dr. C. M. Weed, Hanover, N. H., secretary.

The American Microscopical Society will meet on Aug. 11 and 12.

The Association of American Agricultural Colleges and Experiment Stations will meet in the Law Lecture Room of Columbian University on Wednesday, Aug. 12, at 10 A.M., and will have daily sessions on Aug. 13, 14, 15. Under the terms of the new trust, which endows in perpetuity the great agricultural work of Lawes and Gilbert at Rothamsted, England, a representative of Rothamsted is to visit America every three years as an exponent of Rothamsted and its work. The first of these visits is to occur at the Washington meeting, and R. Warrington, F.C.S., the chemist at Rothamsted, has been appointed representative. He will give six evening lectures, beginning on Aug. 12.

The Association of Official Agricultural Chemists will meet in the Law Lecture Room of the Columbian University, on Thursday, Aug. 13, at 10 A.M., and continue its sessions Friday and Saturday.

The meetings of the Society for the Promotion of Agricultural Science will be held on Monday and Tuesday, Aug. 17 and 18, in the Columbian University. A conference of chemists, including a meeting of the Washington Chemical Society, will be held Aug. 17 or 18 at the same place; and the Association of Economic Entomologists will meet on Aug. 18 and 19.

The Geological Society of America will hold its summer meeting on Monday and Tuesday, Aug. 23 and 24, in Columbian University. Mr. Baily Willis, United States Geological Survey, is chairman of the local committee of arrangements for the society, and Professor H. L. Fairchild of Rochester, N.Y., is secretary of the society. These gentlemen will give further information on application.

The International Congress of Geologists will begin its meeting at 10 o'clock on Wednesday, Aug. 25, in the Columbian University, and will continue with daily sessions until Tuesday, Sept. 1. On Wednesday, Aug. 26, a reception will be given to the International Congress by the Geological Society of America.

For further information relating to the congress, address Mr. S. F. Emmons, United States Geological Survey, Secretary of Committee of Organization.

The capital contains so many public buildings and institutions of interest to strangers that it is proposed to pay special attention to arrangements by which members of the association and their friends can utilize to the best advantage the intervals between meetings, receptions, and other engagements that must necessarily occupy much of their time. Through the co-operation of the heads of the various departments and bureaus, suitable times will be assigned, and officers detailed, to facilitate visits to the Capitol, White House, department buildings, scientific bureaus, Smithsonian Institution, National Museum, Washington Monument, Navy Yard, Naval Observatory, and other places of interest within easy driving distance, such as the National Zoological Park, Soldiers' Home, Arlington, and Glen Echo.

Excursions may be made to Alexandria, Mt. Vernon, Bay Ridge, Great Falls of the Potomac, Harper's Ferry, Luray Cavern, the Grottoes of the Shenandoah, Natural Bridge, Penmar, Gettysburg, and Old Point Comfort. Details regarding these and similar excursions will be arranged, and the most favorable terms secured, in order that members may come to an early decision as to the trips they desire to make.

In addition to excursions such as those mentioned, it has been suggested that some members of the association might like to make a short ocean voyage after the meeting, such as, for instance, to the West Indies, the Bahamas, Bermuda, or Newfoundland. The round trip from New York to St. Johns, N.F., *via* Halifax, can be made in twelve days; or, if extended to Pilley Island (in latitude 49° 34′ north, longitude 55° 50′ west), in eighteen days. For a party of forty persons the individual expense for the round trip to St.

Johns would be $50, and to Pilley Island $60. Similarly, very favorable terms can be obtained for other voyages, and the committee will be pleased to render all the assistance in its power in arranging the details of such excursions.

A reception to the association will be given by the Board of Trade of Washington in the parlors of the Arlington at the close of the president's address on Wednesday evening, Aug. 19.

THE CURABILITY OF PULMONARY PHTHISIS.

IN reference to the question of the curability of consumption, says Dr. T. Harris in the *Lancet* of May 2, we may recognize three classes of cases.

1. Cases of very limited tubercular disease of the lung, where the lesion is small, and is eventually replaced either by fibrous tissue and a completely calcified caseous focus. As far as our experience goes, such cases are always instances of very localized and very small foci, and the disease is never an extensive one. These cases are the only ones which can be considered as perfectly healed, and where the lesion (cicatrix or calcareous focus) which remains does not involve a risk to the possessor, such lesions, so far as we know, not being liable to set up either a local or general tuberculosis. These lesions are not unfrequently found in the lungs of persons who have died of various diseases and from injuries, but it is not known how frequently the tubercular change has been extensive enough to cause distinctive signs and symptoms of pulmonary tuberculosis. Probably the majority of the persons in whose bodies such foci of obsolete tubercle are found have at no period of their lives presented the usual signs or symptoms of consumption, the lesion having been very small.

2. Cases similar to the above, but where the remains of the tubercular disease is not at all or only imperfectly calcified. Although the physician, from the examination of the chest, and the consideration that all the symptoms of phthisis have disappeared, may regard such cases as cured, they cannot be so considered by the pathologist. The latter knows from the microscopical examination of such foci, and from the results of inoculation experiments with animals, that such foci are dangerous, and may at any time give rise to further destructive changes in the lungs or to the general miliary tuberculosis. They are cases, however, which, if the person remains under favorable conditions for preserving health, may pass on to a complete cure, and then deserve a place in Class 1.

3. Cases which run a prolonged course, often with periods when the disease remains quiescent, and which are characterized pathologically by the formation of much fibrous tissue. It is some of these cases which are so misleading to the medical man, and cause the hopes of the sufferer not only to be raised, but cause him to believe that he is cured. This feeling is a consequence of the disease having become temporarily arrested, or, as is probably more frequently the case, by its progressing extremely slowly and being associated with few physical signs and symptoms of extending disease. Very many cases of phthisis come under this heading, and it is rare for a case of chronic phthisis to be continually progressive. Nearly all such forms of the disease are associated with periods of relative good health when the disease appears to be quiescent. The fact that many cases of phthisis belong to this class renders any conclusions as to the good effects of any particular treatment so fallacious. The enthusiastic therapeutist is very prone to conclude that the favorable results are the consequence of the treatment adopted, and to forget that the favorable symptoms and signs may be explained as manifestations of the natural course of the disease. The history of the treatment of pulmonary tuberculosis is full of such fallacies.

From a consideration of the above classes it follows that some cases of phthisis are completely cured, but that the disease in such instances has never been a very extensive one. The majority of cases of phthisis we are compelled to consider belong to the last-mentioned classes, and consequently to be cases which often show a tendency to cure, but rarely perfectly attain that end. The tendency, however, in very many cases of phthisis is towards arrest; and it is the evidence on this point, together with the absolute proof which we have, that in some cases a complete cure does result, that gives us encouragement to persist in treatment, and warrants us in holding out good hopes of recovery to the unfortunate sufferers in the early stages of the disease.

EXPERIMENTS ON THE FEEDING OF HOGS.

THE following is a summary of experiments made by the Illinois Experiment Station at Champaign during the years 1888, 1889, and 1890.

In eight trials in which corn only was fed, aside from salt and coal slack, pigs varying in average weight from 65 to 290 pounds and kept in pens or small lots without grass, gained at the rate of from 10.46 to 14.73 pounds per bushel (56 pounds) shelled corn, the average gain being 12.36 pounds. The rate of gain for food eaten, and the food eaten in proportion to weight, decreased after four to six weeks feeding with corn only. The corn eaten per day varied from 3.41 pounds, eaten by pigs averaging 65.58 pounds, to 10.71 pounds, eaten by pigs weighing 311 pounds. The corn eaten per day per 100 pounds live weight varied from 1.95 pounds eaten by pigs fed 84 days and averaging 207 in weight, to 5.19 pounds eaten by pigs averaging 65.58 pounds. In one case in the fourth week of pen feeding two pigs gained 3.21 pounds each per day — at the rate of 16.81 pounds per bushel of corn. This was the greatest gain per day, and was also the best rate of gain in any trial. There seemed to be no constant relation between the weight of the pigs or the season of the year, and the food eaten or the gains made.

In four trials, pigs fed all they would eat of shelled corn, with blue grass pasture, ate 4,216.5 pounds of corn and gained 905 pounds, which was at the rate of 12.04 pounds gain per bushel of corn. Pigs under like conditions, except that they were fed but half as much corn, ate 2,190 pounds of corn and gained 505 pounds, which was at the rate of 12.93 pounds per bushel. Pigs in dry lots, fed shelled corn, ate 4,207 pounds of corn and gained 790.5 pounds, which was at the rate of 10.52 pounds per bushel.

After periods varying from six to nine weeks, the pigs which had been fed a half ration of corn on pasture, were given a full feed of corn, the others being fed as before. In three trials lasting four or five weeks each, the pigs which had had a full feed of corn throughout ate 1,796 pounds of corn, and gained 339 pounds, which was at the rate of 10.11 pounds per bushel. Those which had been fed a half-feed of corn in the first part of the trials ate 2,075.5 pounds of corn in the second part, and gained 462.5 pounds, which was at the rate of 12.5 pounds per bushel. Those fed corn only ate 1,624.5 pounds of corn and gained 224 pounds, which was at the rate of 7.44 pounds per bushel.

In two trials pigs fed soaked corn ate more and gained more than those fed dry corn. In one trial they gained more, and in one less, in proportion to food eaten than those fed dry corn. The differences were not great in either case.

Two pigs in a pasture in which were three yearling steers were fed corn, gaining in 24 weeks 195 pounds. In a second trial two pigs with like conditions gained 231 pounds in 31 weeks. In neither case was the gain large. In each case the pigs at the close of the trial were in good condition for full feeding and made large gains when so fed.

A trial of apple pomace as food for pigs resulted unsatisfactorily. The pomace kept well. Chemical analysis of it showed an apparently good composition for feeding purposes; but the pigs ate very little of the pomace.

HEALTH MATTERS.

Morning Cold Baths.

IN the past few years several patients have come to me, says a medical writer in the London *Lancet*, complaining that they from time to time, especially in winter, in the early part of the day, have expectorated mucus tinged with blood. In each case there was no family history of phthisis, the temperature was normal, there were no bacilli discoverable in the sputa, there was no loss

of strength or weight, and the chest-sounds were healthy. The men, however, were not of a vigorous type, and they were all accustomed to have a cold bath summer and winter. It seemed likely, especially in winter, that the sudden application of intensely cold water to the whole surface of the skin too suddenly raised the internal blood-pressure, and hence the oozing of the blood through the walls of the capillary vessels lying beneath the lining membrane of the throat or larynx, or possibly the lungs. In any case, whatever the true explanation may be, the fact stands out that the unpleasant symptom disappeared as soon as the temperature of the icy cold water was reasonably increased. The practice of taking a cold bath is so universal nowadays that it is perhaps as well to know that although the strong man may indulge in it with unmixed benefit, it may cause in the weak man a symptom which fills him with anxiety.

Lannelongue's Treatment of Tuberculosis.

The object aimed at by this method, as stated by the *Lancet*, is to bring about a sclerosis of the tubercular tissue, whatever may be its seat. The cases thus far treated have been mainly those of surgical tuberculosis.

Experiments have shown that chloride of zinc produces a remarkable fibroid change in the normal tissues of animals; and, as might be expected, the same fibroid transformation is brought about by the same agent in morbid tissues in general, including the tubercular. This chemical compound may be said to fix the anatomical elements by killing them, for it obliterates the capillaries and smaller vessels around where it has been deposited. An inflammatory action is thus set up in the vascular walls, which narrows the calibre of the surrounding vessels for a considerable distance from the initial point. But over and above this another local change of the highest import is brought about. Very rapidly — even within a few hours — there is produced in the altered tissues, by transmigration, and probably also by cell proliferation, an enormous afflux of new anatomical elements. These young cells cause fresh œdema of the periphery of the granulation growths, and infiltrate the tubercular neoplasm to the fullest extent. From this moment the struggle sets in between the accumulated elements and the bacilli, especially between the migratory cells and the microbes, to the detriment of the latter. However it may be as to the strife between cell and bacillus, the elements of the morbid growth which the chloride of zinc had destroyed are re-absorbed slowly, and finally disappear. The young cells, on the contrary, organize with great activity, and form a firm fibrous tissue, which is met with in appreciable quantity as early as the day next after the injection.

Following the sclerosis in articular fungosities, there is produced a thickening and subsequent condensation of osseous tissue if the periosteum be involved in the reparative process, as was the case in the examples of osteo-arthritic disease cited by the author. The remote results, so far as it is yet possible to judge, show a marked tendency for the sclerosed elements to be replaced by a more pliable connective tissue. As a consequence, the diseased parts regain their suppleness and their form, while locomotor functions are preserved entirely, or at least to the limits present at the beginning of the treatment.

The Artificial Production of Dental Caries.

For the past year Mr. Sewill, following other experimenters in the same field, has been endeavoring to produce caries in extracted teeth; and certainly the microscopical appearances presented by the sections shown at the Odontological Society, says the *Lancet*, differed but little from those of natural caries. He found that the best mixture of organic substances for the purpose was one part of bread to eight of saliva. Meat with saliva remained alkaline, and if a small quantity of acid were added became again rapidly alkaline. Albumen, whether as white of egg or other forms, acted in the same way. Saliva and starch produced little acid, which was soon exhausted.

The teeth were immersed in the mixture in glass-stoppered bottles, and kept at a temperature of 35° to 37° C. The bottles were unstoppered about once a day for examination; this, of course, admitted air, and if the mixture became putrid, it at once showed an alkaline reaction, in which case the teeth were taken out, well washed, and the mixture renewed. The mixture became rapidly acid, and remained so (unless putrefaction to a large degree supervened) for from three to five weeks. The acids present were acetic and lactic; of the former 5 per cent and of the latter 0.5 per cent were found after three weeks. The effects upon the tissues were precisely the same, both macroscopical and microscopical, as in natural caries. As in natural caries, the decay was found to commence most readily in places where there was ill-formed enamel or flaws or fissures which allowed access to the dentine, in which tissue the caries progressed more rapidly than in enamel. Cementum resisted longer than enamel, but at length yielded, and allowed the dentine beneath to be invaded. Discoloration was often present, and it was found that carious dentine readily took up stains from such substances as are often admitted to the mouth in medicines or articles of food. Microscopically the translucent zone is well shown, also the "pipe-stems" appearance in transverse sections, and the dentinal tubes are filled with micro-organisms, just as in natural caries.

The conclusions that Mr. Sewill draws from these experiments, and from the facts that caries takes place in natural teeth which are used as artificial substitutes, are, that caries is entirely due to external agents, and that vital action in no way modifies the disease.

NOTES AND NEWS.

THE university extension work has been organized in Chicago. Cleveland, Indianapolis, Fort Wayne, and Altoona are among the latest applicants for branches.

— Accessions to the membership of the Society for the Extension of University Teaching continue to be sent in at the rate of nearly a hundred a week. The best indication of the national character of the work is found in the wide area from which these applications are received, every State in the Union being now represented on the rolls.

— The work of the St. Paul (Minn.) Academy of Science continues to meet with increasing support and encouragement. The museum is receiving many additions, its rooms being permanent and well adapted for the purpose. Persons willing or desirous of adding to its collections by loan, gift, or exchange, are invited to correspond with Professor W. F. Phelps, chairman of the committee on museum, or with Mr. C. B. Scott, curator. It is gratifying to learn that the university extension classes, organized under the auspices of the academy, and conducted by professors from the State University, from Carlton College, and other near-by points, have proven quite successful and promise much for the future.

— The heavy sentence of four years' imprisonment, in addition to fines, imposed in France recently on four persons connected with the alleged sale of the secret of melinite to an English firm gives a new turn to that strange affair. It was recently announced by the French minister of war that M. Turpin, the inventor, and Captain Triponé, the agent of the English firm, really had nothing of value to the French government to negotiate for, and that the most important part of the invention — the means of exploding melinite after it has been united with another substance in the shell — remained in the sole possession of the government. This second substance, according to the New York *Times*, is cresilite, a nitro-cresol obtained from a coal-tar product; and after two-thirds of the space in the shell has been filled with it, melinite is rammed in — a fact which sufficiently indicates that both products can be safety handled, and can be exploded only by a powerful detonator.

— In its latest report the Board of Health of the city of Boston says: "We are of the same opinion now as we were when we made our last annual report, that the large expense to the city, and the perpetual nuisance which attends the storing and handling of garbage, should be abolished by burning it in the kitchen, where it first appears as waste, and before decomposition has begun to make it offensive. By this method the only expense to be

incurred would be the purchase of the pail or other attachment for the kitchen range, which would be less in a term of five years than the present cost of receptacles for storing the garbage. It is a mistake to throw this material upon the fire, for then the combustion is imperfect, and very offensive odors are given off. It should always be placed in a receptacle specially and conveniently arranged for the purpose, in some part of the stove. The ordinary heat of the stove will dry out all moisture and leave charcoal, to be burned like other fuel. There are several patented devices already in the market for this purpose. One of them is obtained only in the construction of the stove, and consists of a receptacle in the side of the stove in which the garbage is put, completely desiccated, and then dumped into the fire. Another consists of a small pail arranged for the purpose, can be applied to any stove, and is said to answer the needs well."

— At a recent meeting of the Chicago Medical Society, says the *Medical Record*, Dr. J. Frank reported a case where a man every July shed his skin. He was taken with feverish tremors, increasing almost to paroxysms. He undressed, lay down, and within a few minutes the skin of the chest began to turn red. The redness rapidly extended over the entire skin, and the feverish tremors continued uninterrupted for about twelve hours. Then he arose, dressed, and walked about in perfect health. The skin now commenced to peel, and ten hours later it began to come off in great patches. From the arms and legs it could be pulled off exactly like gloves or stockings As the old skin came away a new epidermis, as soft and pink as a baby's, was revealed. This new skin was very sensitive; the patient has to wear softened gloves and moccasins for about a week. After the old cuticle had been entirely removed the finger and toe nails began to drop off — new nails literally crowding them out. Finally the change was complete, the man had a new skin and a new outfit of nails, and was ready to return to the mines. The shedding began in his first year and recurred every July thereafter.

— It is worthy of remark that the idea of university extension has taken root in other than English-speaking countries. A Danish correspondent writes to the Oxford *Gazette* in regard to work in Denmark: "About five years ago the undergraduates of the University of Copenhagen undertook to give free instruction to the working classes and others who were in need of such instruction. Courses were given in languages, natural science, and all subjects commonly taught in high schools. The rooms in which the instruction was given were lent free by the schools and other institutions. The movement succeeded, and after three years the organizing committee applied for and got State aid, to which, however, no conditions were attached. It was only an encouragement given to the brave efforts of the students. The undergraduates now give free legal advice through competent men, and the movement is extending in every direction. Branches of the central society in Copenhagen have already been established in the chief towns of Denmark, and it is only a question of time when the whole country will be covered by a network of similar instruction."

— Some time ago, says *Engineering*, Mr. Bryan Donkin made a number of experiments on the flow of heat through the walls of a steam engine cylinder, using for the purpose delicate thermometers. At a recent meeting of the American Institute of Electrical Engineers Professor E. H. Hall gave the results of some preliminary experiments on the same subject, made with a thermopile, consisting of a plug of iron, which was screwed into a $\frac{3}{4}$-inch hole in the cylinder, and had a small hole bored through its centre. Down this hole was passed a nickel plug attached at one end to a thin iron plate, which was also attached to the iron plug. The outer ends of the iron and nickel plugs were connected to a delicate galvanometer in the usual way, and the nickel was of course insulated from all contact with the iron save by the thin plate already mentioned. Three thermopiles constructed on this system were used. In the first the plate connecting the two elements was one-half a millimetre thick, in the second one millimetre thick, and in the third two millimetres thick. The engine cut off at about $\frac{1}{4}$ stroke, and ran at sixty revolutions per minute. It was found that using the plug with the one-half millimetre plate, the temperature at cut-off was below the maximum, and fell rapidly during exhaustion. The ebb and flow of heat in the cylinder walls was very evident. Heat rushes into these walls at admission, but at cut-off, begins to travel back into the cylinder again, and continues during exhaust to flow from the walls and to boil off any water that may be in the cylinder. Professor Hall thinks that there is evidence to show that in the case of the engine on which he was experimenting a layer of water remained in the cylinder walls from the previous stroke, thus increasing condensation.

— Captain Cowell of the British ship "Drumeltan" reports as follows to the Hydrographic Office on the use of oil in stormy weather at sea: "I have for eighteen or twenty years used oil-bags in heavy running, especially in running down the easting on Australian and New Zealand voyages from England; they have always acted well, the ship running considerably drier, with less sea on board. I have always used canvas bags, first filled with oakum and then the oil poured in. The bags are hung at each cathead with a rather long lanyard, so that it will sometimes dip in the water as the ship rises and falls. In my last voyage in this ship, in the Pacific, off Patagonia, I lay-to for seventy-two hours in a furious gale from west-south-west, but did not ship any heavy water; had one oil-bag at the weather cathead and another at the mizzen rigging, with long lanyards (4-masted ship). Nothing but spray came on board. I learned afterwards that a good many vessels were damaged in that gale, or rather hurricane. Two days afterwards (April 15, 1890), I myself passed the "Adamant," of Hamburg, dismasted and abandoned. I always keep two oil-bags filled with oakum, ready for oil at short notice, and I invariably destroy the old bags, as they are liable to dry hard and become useless."

— Referring to a statement which has been publicly made, that the adoption of electric lighting in place of gas at the office of the Savings Bank Department of the General Post Office, London, has been followed by a marked reduction in the amount of sick leave, the *Lancet* says it has good authority for believing that the statement in question is substantially correct. Although the time which has as yet elapsed — two years — since the introduction of the new illuminant has been insufficient for the collection of trustworthy statistics, the paper named thinks there is every reason to believe that electric lighting will prove to be much more wholesome than ordinary gas flames. An electric lamp does not compete for the oxygen of the apartment in which it is placed, and this circumstance gives it a marked advantage over any open flame. It cannot, like some forms of gas-burner, be used to promote ventilation; but in ordinary situations its harmlessness is a much more important property.

— An antiquarian find which will excite interest all over Europe, says the *Academy*, has lately been made in Rœvemose peat bog, near Hobro in Jutland, Aalborg Amt. The objects are all of silver, the principal piece being a very large basin, on which have been fastened plates of silver hammered out with figures of men, women, and animals. The basin is twenty-six Danish inches in diameter, but scarcely eight inhes high. One or two pieces are apparently wanting; but it is hoped they will turn up when the moss is minutely examined. The eye-holes of the figures are now empty, but had evidently been filled with colored glass. One of the plates, which is nearly seventeen inches long, shows warriors, with helmets and other ornaments. One figure is a god with a wheel at his side, and on another are two elephants. A third shows a horned god in a sitting posture with his legs crossed orientalwise. All these have apparently nothing to do with Northern mythology, as was at first supposed. The whole find has now reached the Danish National Museum, and we see that these pieces belong to the god-lore of the Gallic peoples. The god with the wheel, for instance, is the Gallic sun god. The whole is the work of a Gallic artist at that early period when the Roman and Gallic peoples first came in contact. Allowing time for these things to wander so far north, the date would seem to be, as regards Denmark, the first century before Christ. Other things belonging to this Gallic group have been found previously in this country. The total weight of precious metal hitherto exhumed is about twenty Danish pounds.

— The attendance at the lectures of the Society for the Extension of University Teaching for the past season, as reported from the general offices of the society at Philadelphia, was exceptionally large, as compared with any previous experience either in this country or England, and, as a result, many may hesitate to form centres because they see no prospect of getting two or three hundred to follow the lectures of the course. Perhaps it may be well in this connection to notice the fact that in the printed report of the London society the average number present at each lecture in many centres is found to vary between eight and fifty. In many cases, certainly, the attendance was much larger, but it is by no means clear that the smaller centres were not fully as successful in several important particulars. It has been observed, for example, that the percentage of those in attendance at the lectures, who also took part in the class work, was greater in the smaller groups. Since so many of the benefits of extension work are dependent upon a participation in the lectures by the class, one must conclude that proportionately the smaller centres were more successful. Wherever there are a score of persons who wish to hear a given course, there should be no hesitation on account of the small numbers. Better results in many ways will be obtained under these circumstances.

— During recent years a good deal has been said amongst marine zoölogists of the use, as a food supply, that might be made of the enormous numbers of copepoda that swarm in the surface-waters of the sea, says a Norwegian correspondent of *Nature*, and the Prince of Monaco has pointed out the value this widely-distributed nutritious matter might have to shipwrecked sailors; but I am not aware that any one has yet actually made the experiment of cooking and eating copepoda, so the following record may be of some interest. While tow-netting during the last few days about the North Cape, we have had some large hauls of copepoda; and it occured to us last night, while watching the midnight sun off the entrance to the Lyngen fjord, that one gathering might be spared from the preserving bottle and devoted to the saucepan. We put out one of the smaller tow-nets (3½ feet long, mouth one foot in diameter) from 11.40 P.M. to midnight, the ship going dead slow, and traversing in all, say, a mile and a half during the twenty minutes. The net when hauled in contained about three tablespoonfuls of a large red copepod (*Calanus finmarchicus*, I think), apparently a pure gathering — what Haeckel would call a monotonic plankton. We conveyed our material at once to the galley, washed it in a fine colander, boiled it for a few minutes with butter, salt, and pepper, poured it into a dish, covered it with a thin layer of melted butter, set it in ice to cool and stiffen, had it this morning for breakfast on thin bread and butter, and found it most excellent. The taste is less pronounced than that of shrimps, and has more the flavor of lobster. Our twenty minutes' haul of the small net through a mile or two of sea made, when cooked in butter, a dishful which was shared by eight people, and would probably have formed, with biscuit or bread, a nourishing meal for one person. It would apparently, in these seas, be easy to gather very large quantities, which might be preserved in tins or dishes, like potted shrimps.

— The annual meeting of the Society for the Preservation of the Monuments of Ancient Egypt was held last week, says *Nature* of July 23, in the rooms of the Society of Antiquaries at Burlington House. Lord Wharncliffe, president, occupied the chair. The report stated that there was little to report of success attending the proceedings of the society for the past year. Its energies had been directed principally to two points, the necessity for an official inspector or superintendent in Egypt, whose duty should be the care of the ancient monuments, and an endeavor to do something towards arresting the gradual destruction of the Great Temple at Karnak. Reports concerning a proposed scheme for barring the Nile below Philæ, to make a vast reservoir for purposes of irrigation, had appeared in the public papers from time to time, and recently various more definite communications had been received by the committee on the same subject. The result would be, it was acknowledged, to completely cover this beautiful island and temple with water. There had been some correspondence on this subject with the authorities in Egypt; but as nothing had as yet been decided as to any scheme of irrigation, and as a committee would be appointed to consider the whole question, it might be considered as suspended for the present, and the committee had thought it best to wait before taking any further action; but they would not lose sight of this important matter, and would oppose to the utmost of their power any engineering scheme which would involve injury or destruction to this world-renowned spot. General Donnelly moved the adoption of the report; and the motion was seconded by Sir Edmund Henderson, and agreed to. The committee for the coming year was then elected, and a discussion subsequently took place as to the proposed scheme for barring the Nile below Philæ, the opinion of the meeting being evidently strongly opposed to the adoption of any system of irrigation which should involve damage to the temple. Mr. J. Bryce, M.P., spoke of the wanton injury which was often inflicted on monuments in Egypt, and said that he thought it would be necessary, in dealing with that matter, to bring the question of jurisdiction to the attention of those from whom any system of inspection or care was to emanate.

— The most remarkable example of reclamation by means of artesian well-water, says United States Irrigation Commissioner Hinton, in an official report, is found in the desert provinces or departments of Algeria under the French rule. The area, officially given, of French Algeria, is 184,465 square miles. The outlying portion is put at 135,000 square miles. In this total of over 329,415 square miles one-half belongs to the Sahara or desert. The European population in 1887 was about 250,000; the natives and naturalized were 3,328,549, making a total of 3,578,549. Cultivation by means of flowing well-waters has been sedulously fostered by the French colonial government for both political and economic reasons. Such wells as a means of reclamation began systematically to be bored in 1857, the French engineer M. Jus having demonstrated in 1856 that the desert was endowed with large supplies of underground water. The total number of wells that have been bored since that date in the departments of Algiers, Oran, and Constantine is stated at 13,135. These wells range from 75 to 400 feet in depth, and the low pressure common to the majority of them forces the water to a distance of about two feet above the ground. The waters are then collected in small ditches, which convey them to the vineyards, date-trees, and fields of durra, millet, wheat, etc., which comprise the chief products. In all, about 12,000,000 acres have been reclaimed in this way. The government bores are at least one-tenth of the whole number. As an illustration of the reclamation brought about by this well irrigation, the following figures from a report made in 1885 will be of value, but they relate solely to the cultivation of the grape for wine-making purposes. In the province of Algeria there are 60,322 acres; in Constantine, 25,021 acres; in Oran, 26,114. Under this species of cultivation Algeria is becoming a great wine-growing country. It sent to France during eleven months of 1886, 10,513,966 gallons of wine; and of cider in the same year, 219,277,124 gallons were made. The date-palm is the largest product of the desert oases proper. The total area under colonization or settled occupation in 1887 is given at 49,400,000 acres; under cultivation by irrigation in wheat, barley, oats, vines, olives, dates, tobacco, etc., at 17,041,133. The forest plantations cover 5,000,000 acres.

— Professor Louis Bevier of Rutgers College has been appointed to organize the work of university extension in connection with that institution.

— Professor Jeremiah W. Jenks of the University of Indiana has accepted the chair of social, political, and municipal institutions in Cornell University.

— W. F. Durand, late of the Agricultural College of Michigan, is now professor of mechanical engineering at Pardue University, Lafayette, Ind.

— Professor A. T. Woods, well-known as a writer on mechanical topics, has resigned the professorship of mechanical engineering in the Illinois State University to become professor of dynamic engineering in Washington University at St. Louis.

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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

THE PREPARATION OF MACARONI IN ITALY.

MACARONI is the *semoule*, or flour of wheat, moistened with water, kneaded until it assumes the requisite consistency, cut or pressed into the desired shape, and thoroughly dried. When wheaten flour is agitated in a large quantity of water, the starchy substances are dissolved, leaving a tough fibrous mass, which is gluten. Gluten contains nitrogen, while starch does not; hence the *semoule* or flour that contains the most gluten is the most nutritious. As compared with gluten, starch has but little strength; hence macaroni that is rich in gluten is not only the most nutritious, but is stronger, thereby preserving its shape while being dried and cooked.

The United States Consul-General at Rome says that for the best macaroni, the hard, semi-translucent varieties of wheat grown in warm countries, which contain a large proportion of gluten, are used in the form of *semoule;* for the cheaper grades common flour is used. Any intermediate grade can be made by mixing the two in various proportions. There are no statistics giving the quantity of macaroni made in Italy; but, as it constitutes one of the chief articles of food, the quantity must be exceedingly great. There are many large establishments manufacturing it by steam-power, and probably many thousands worked entirely by hand-power, and employing from three to five or six hands each. It is also an article of daily household production in a large proportion of Italian families. In the household the appliances are exceedingly simple — a smooth board, a piece of marble for kneading, and a common rolling-pin. One pound of flour is mixed with four or five eggs, moistened with hot water, kneaded a few minutes, and then rolled out very thin with the rolling-pin. After drying on the kneading-board for fifteen or twenty minutes, until the surface loses its adhesiveness, it is rolled up tightly, and thin slices are cut from the ends. The slices falling apart constitute strings of macaroni, and are ready for use. The macaroni factory which is worked by hand often consists of but one room, exclusive of the drying-rooms. The proprietor, with one or two workmen, makes the macaroni, and the wife sells it. The machinery is inexpensive, and the hired labor costs but little.

Artificial heat is seldom employed for drying, but the manufacture is often carried on in connection with the baking business. In this case, the drying-rooms would be above the ovens, and warmed somewhat by the waste heat. The result is, that these small establishments can successfully compete with the larger factories that are worked by steam-power. Their machinery generally consists of a mixer, a kneader, and a press. The mixer may be described as a semi-circular trough, having a hinged cover. Through the trough runs an iron shaft, having a number of projecting arms, with a crank on one end. About one hundred pounds of *semoule* or flour, or a mixture of both, according to the quality of the macaroni desired to be produced, is placed in wooden troughs, that stand in front of the mixer. To this is added a sufficient quantity of water, at about 160° F., containing in solution a small quantity of saffron, to give the macaroni the desired color. It is then mixed by hand for a few minutes, in order to fairly distribute the water, after which it is put into the mixer. The lid being closed, a workman turns the crank for about twenty minutes, when the contents are found to be converted by the action of the arms attached to the crank shaft, into a stiff dough.

From the mixer the dough is taken to the kneading-table. This is made in a number of ways. One of the most common in the neighborhood of Rome consists of a kneading-plank about forty inches long, thirty-two inches wide at the inner end, and forty inches at the outer end, with sides to keep the dough from falling out. It is solidly made of hard wood two and a half to three inches thick, and firmly attached to the floor and wall. The kneading is generally done by two or three men with a long bar attached by a swivel joint to the wall at the back of the table. This bar is about sixteen feet long, ten inches deep next to the wall, and three inches at the other end. The part next to the dough is bevelled to the shape of a blunt wedge with a rounded edge. The bar is worked up and down on the dough, and being fastened at the end exerts a tremendous and crushing force. Being made of a tough, elastic wood, it both readily sustains the full weight of the men when pressed down, and springs back above the dough sufficiently to allow it to be moved a little, and brought down on another part. This kneading continues for about twenty-five minutes, when the dough is ready for the press.

In some places the table is a straight plank about eight to ten feet long and fifteen inches wide, with sides to hold the dough in position The kneading is done by means of a drum about four feet in diameter, and the width of the plank. It is worked backwards and forwards by means of an upright capstan, about twelve inches in diameter, with a rope coiled round it and around suitable mechanism on the drum.

As soon as the dough is in a suitable condition, it is taken to the press, which consists chiefly of a cylinder about eight to ten inches in diameter, and twenty to twenty-four inches long, a plunger that fits the interior accurately, and a die plate that rests on a shoulder cast on the lower portion. The plunger is forced down by a screw, which is suitably connected, by working with a crank by hand. While one man mixes the dough, another turns the crank to press it, and the third takes the macaroni as it leaves the dies, cuts it into suitable lengths, and hangs it on light cane or bamboo sticks about five or six feet in length, ready to be carried to the drying-room. The press is heated to about 160° F. by means of a small pot of live coals, which is placed inside the cylinder a few minutes before pressing begins. From the presses the long macaroni is carried on light bamboo sticks to the drying-rooms. The small and fancy shapes are dried on screens. These are wooden frames about two feet by six, covered with a coarse cloth, so as to allow the air to freely circulate. A brace across the middle of the frame serves as a handle. The small and fancy macaroni is made in horizontal presses. Cutters revolving more or less rapidly near the face of the die, according to the length required, cut it into any desired length. The speed of the cutters is regulated by a pair of cone pulleys.

The drying of the macaroni is the most difficult and delicate part of the manufacture, and depends much upon the state of the atmosphere. It is first dried in the open air, the time in the sun or shade depending on the temperature and dryness of the atmosphere, from half an hour to three hours; the time also depends to some extent on the size of the macaroni. It is then carried to a close damp room, where it remains about twenty-four hours. If the room is not sufficiently damp it must be kept so by artificial

means — by small steam jets or by the evaporation of water. It is sometimes covered with cloths during this stage to prevent drying too rapidly. The rest is a retarding process, and is intended to prevent the surface of the macaroni from drying too fast, and to allow the interior to harden. If the macaroni is not allowed to rest at this stage, it is liable to crumble or split. From the resting rooms it is carried to large spacious rooms that have thorough ventilation, either natural or artificial. It is estimated that for each man employed in the steam factories, about 170 to 200 pounds are produced per day.

REMARKS ON AN ACT FOR THE PREVENTION OF BLINDNESS.[1]

"SECTION 1. Should one or both eyes of an infant become reddened or inflamed at any time within four weeks after its birth, it shall be the duty of the midwife, nurse, or person having charge of said infant, to report the condition of the eyes at once to some legally qualified practitioner of medicine of the city, town, or district in which the parents of the child reside.

"Section 2. Any failure to comply with the provision of this act shall be punishable by a fine not to exceed one hundred dollars, or imprisonment not to exceed six months, or both.

"Section 3. This act shall take effect on the first day of June, eighteen hundred and ninety-one."

This act for the prevention of blindness was passed by the last legislature [of Maine], and was signed by the Governor, March 28. The legislature of New York passed an act similar to this one last year, and was the first State to have a law of this nature upon its statute books. Maine follows the lead and has the honor of being the second State in the Union to have such a law.

It is intended to draw attention more forcibly to purulent inflammation of the eyes, known also as ophthalmia neonatorum or purulent inflammation of the new-born. This disease is always caused by contagion or infection. It will be seen at once that it can be placed among the preventable diseases, and therefore the prophylactic treatment is one of the most important and satisfactory problems in hygiene, because in a large majority of cases the disease can be prevented from spreading. If, however, the disease does spread, and is recognized upon its first appearance, we possess remedies that can be applied by any physician and the disease can be cured at once. It would seem, therefore, that we need some law to call attention to the importance of the early treatment of the infant's eyes that blindness may be prevented, for every blind person represents a certain loss of productiveness to the State, and many are throughout their lives dependent upon relatives or the public for support.

If from twenty to thirty per cent of blindness in the State is due to neglect of proper treatment of this disease, all will agree that it is time something was done to place the neglect of such treatment upon some responsible person. This act for the prevention of blindness will do another good thing by calling attention to the prophylaxis of this disease. Proper treatment will be instituted before and after the birth of the infant in order that the eyes may not become infected, and thus the sight of many will be saved. To indicate how efficient this treatment is, it might be mentioned that after Credé had devised his method of prophylaxis for this disease, he had only two cases in 1,600 infants, whereas, before he practiced his method he had 10,8 per cent of the infants affected with it, which in this instance would be equal to 160 infants, some of whom would become blind in spite of the best treatment then known. By Credé's method of prophylaxis and treatment for this disease no infant need become blind. This means the prevention of an enormous amount of misery and the saving of an enormous amount of productive energy in the United States, estimated at not less than $7,500,000 each year. This enormous loss of wealth to the United States is due to the ravages of a disease as surely preventable as any in medicine. Dr. Burnett of Washington estimates that the disease costs the country more in ten years than all the epidemics of yellow-fever and cholera for the past hundred years.

Dr. E.E. Holt of Portland, Me., in The Sanitary Inspector.

To itemize this account, we find that the cost of keeping a single blind person in our best managed institutions is $132 a year. This makes the cost of sustenance of our blind from this one disease alone about $2,000,000. If we add to this sum what these blind persons would produce if they were not dependents, and reckon their productive wealth at $1.00 per day on an average, we have the enormous sum of $7,500,000. Maine having about one-fiftieth of the blind of the United States shares about one-fiftieth of the misery and loss of productive energy from this disease, which equals $150,000, according to this estimate.

It is our duty to do something to prevent this misery and loss to the State. At the clinic of the Maine Eye and Ear Infirmary many of the bad results of this disease are seen, persons crippled for life, and these defects of the eye are classified under various names giving little or no idea of their origin. These clinics remind one, like those of similar institutions, that not one-half of the misery or loss of productiveness is represented by those who have lost their sight from this disease, for where one has been made blind by it many have been more or less seriously affected in one or both eyes, so that the course of their lives has been changed from one of probable comfort and usefulness to a miserable existence. The statistics do not include this numerous class of persons. But they, as well as those who have been made blind from this disease, appeal to our better nature to do something for them. It will need but a short time to cure the affection if the infant is brought, on the first appearance of the disease. We are backward in this country as compared with some European countries.

In London there is a society for the prevention of blindness which does good work by directing attention more forcibly to the causes which produce this unfortunate disease.

The Ophthalmological Society of the United Kingdom, which is composed of the ablest men from all parts of England, Ireland, and Scotland, took up this subject in 1884, and appointed a committee of the leading men of the society, who unanimously reported that it was a subject for governmental interference.

In Germany, France, and Switzerland stringent regulations have been adopted, which demand of the nurse or person having charge of an infant to report any reddened or inflamed condition of the eyes at once. Three years ago the American Ophthalmological Society appointed a committee to investigate this subject and make a report, which they did last year. They recommended that each member of the society do all he could to have laws enacted that would call the attention of the public, and particularly of those having charge of infants, to the great importance of early treatment of the eyes, should any inflammatory symptoms arise.

EXPERIMENTAL RESEARCHES ON MECHANICAL FLIGHT.

THE following is a translation of a communication made by Professor S. P. Langley to the Paris Academy of Sciences on July 13, and published in *Nature* of July 23: —

I have been carrying out some researches intimately connected with the subject of mechanical flight, the results of which appear to me to be worthy of attention. They will be published shortly in detail in a memoir. Meanwhile I wish to state the principal conclusions arrived at.

In this memoir I do not pretend to develop an art of mechanical flight; but I demonstrate that, with motors having the same weights as those actually constructed, we possess at present the necessary force for sustaining, with very rapid motion, heavy bodies in the air; for example, inclined planes more than a thousand times denser than the medium in which they move.

Further, from the point of view of these experiments and also of the theory underlying them, it appears to be demonstrated that if, in an aerial movement, we have a plane of determined dimensions and weight, inclined at such angles and moving with such velocities that it is always exactly sustained in horizontal flight, the more the velocity is augmented the greater is the force necessary to diminish the sustaining power. It follows that there will be increasing economy of force for each augmentation of velocity,

up to a certain limit which the experiments have not yet determined. This assertion, which I make here with the brevity necessary in this *résumé*, calls for a more ample demonstration, and receives it in the memoir that I have mentioned.

The experiments which I have made during the last four years have been executed with an apparatus having revolving arms about twenty metres in diameter, put in movement by a ten horse-power steam-engine. They are chiefly as follows.

(1) To compare the movements of planes or systems of planes, the weights, surface, form, and variable arrangements, the whole being always in a horizontal position, but disposed in such a manner that it could fall freely.

(2) To determine the work necessary to move such planes or systems of planes, when they are inclined, and possess velocities sufficient for them to be sustained by the reaction of the air in all the conditions of free horizontal flight.

(3) To examine the motions of aerostats provided with their own motors, and various other analogous questions that I shall not mention here.

As a specific example of the first category of experiments which have been carried out, let us take a horizontal plane, loaded (by its own weight) with 464 grams, having a length 0.914 of a metre, a width 0.102 of a metre, a thickness two millimetres, and a density about 1,900 times greater than that of the surrounding air, acted on in the direction of its length by a horizontal force, but able to fall freely.

The first line below gives the horizontal velocities in metres per second; the second the time that the body took to fall in air from a constant height of 1.22 metres, the time of fall in a vacuum being 0.50 of a second.

Horizontal velocities..	0 m.,	5 m.,	10 m.,	15 m.,	20 m.
Time taken to fall from a constant height of 1.22 metres.....	0.53 s.,	0.61 s.,	0.75 s.,	1.05 s.,	2.00 s.

When the experiment is made under the best conditions it is striking, because, the plane having no inclination, there is no vertical component of apparent pressure to prolong the time of fall; and yet, although the specific gravity is in this more than 1,900 times that of the air, and although the body is quite free to fall, it descends very slowly, as if its weight were diminished a great number of times. What is more, the increase in the time of fall is even greater than the acceleration of the lateral movement.

The same plane, under the same conditions, except that it was moved in the direction of its length, gave analogous but much more marked results; and some observations of the same kind have been made in numerous experiments with other planes, and under more varied conditions.

From that which precedes, the general conclusion may be deduced that the time of fall of a given body in air, whatever may be its weight, may be indefinitely prolonged by lateral motion, and this result indicates the account that ought to be taken of the inertia of air, in aerial locomotion, a property which, if it has not been neglected in this case, has certainly not received up to the present the attention that is due to it. By this (and also in consequence of that which follows) we have established the necessity of examining more attentively the practical possibility of an art very admissible in theory — that of causing heavy and conveniently disposed bodies to slide or, if I may say so, to travel in air.

In order to indicate by another specific example the nature of the data obtained in the second category of my experiments, I will cite the results found with the same plane, but carrying a weight of 500 grams, that is 5,380 grams per square metre, inclined at different angles, and moving in the direction of its length. It is entirely free to rise under the pressure of the air, as in the first example it was free to fall; but when it has left its support, the velocity is regulated in such a manner that it will always be subjected to a horizontal motion.

The first column of the following table gives the angle (α) with the horizon; the second the corresponding velocity (V) of *planement* — that is, the velocity which is exactly sufficient to sustain the plane in horizontal movement, when the reaction of the air causes it to rise from its support; the third column indicates in grams the resistances to the movement forward for the corresponding velocities — a resistance that is shown by a dynamometer. These three columns only contain the data of the same experiment. The fourth column shows the product of the values indicated in the second and third — that is to say, the work T, in kilogram-metres per second, which has overcome the resistance. Finally, the fifth column, P, designates the weight in kilograms of a system of such planes that a one horse-power engine ought to cause to advance horizontally with the velocity V and at the angle of inclination α.

α	V	R	$T = \frac{VR}{1000}$	$P = \frac{500 \times 4554}{T \times 60 \times 1000}$
45	11.2	500	5.6	6.8
30	10.6	275	2.9	13.0
15	11.2	128	1.4	26.5
10	12.4	88	1.1	34.8
5	15.2	45	0.7	55.5
2	20.0	20	0.4	95.0

As to the values given in the last column, it is necessary to add that my experiments demonstrate that, in rapid flight, one may suppose such planes to have very small interstices, without diminishing sensibly the power of support of any of them.

It is also necessary to remark that the considerable weights given here to the planes have only the object of facilitating the quantitative experiments. I have found that surfaces approximately plane, and weighing ten times less, are sufficiently strong to be employed in flight, such as has been actually obtained, so that in the last case more than 85 kilograms are disposable for motors and other accessories. As a matter of fact, complete motors weighing less than five kilograms per horse-power have recently been constructed.

Although I have made use of planes for my quantitative experiments, I do not regard this form of surface as that which gives the best results. I think, therefore, that the weights I have given in the last column may be considered as less than those that could be transported with the corresponding velocities, if in free flight one is able to guide the movement in such a manner as to assure horizontal locomotion — an essential condition to the economical employment of the power at our disposal.

The execution of these conditions, as of those that impose the practical necessity of ascending and descending with safety, belongs more to the art of which I have spoken than to my subject.

The points that I have endeavored to demonstrate in the memoir in question are —

(1) That the force requisite to sustain inclined planes in horizontal aerial locomotion diminishes, instead of increasing, when the velocity is augmented, and that up to very high velocities, — a proposition the complete experimental demonstration of which will be given in my memoir; but I hope that its apparent improbability will be diminished by the examination of the preceding examples.

(2) That the work necessary to sustain in high velocity the weights of an apparatus composed of planes and a motor may be produced by motors so light as those that have actually been constructed, provided that care is taken to conveniently direct the apparatus in free flight, with other conclusions of an analogous character.

I hope soon to have the honor of submitting a more complete account of the experiments to the academy.

OLD STANDARDS.

By a curious accident it has just been discovered that the standard yard and certain other measures and weights which were supposed to have been lost when the Houses of Parliament were destroyed by fire in 1834 are still in existence. The following account of the matter, condensed from a statement in the London *Times*, is given in a recent issue of *Nature*.

A reference to the contemporary records shows that after the fire the standard bars of 1758 and 1760 were both found among the ruins, "but they were too much injured to indicate the measure of a yard which had been marked upon them." The principal

injury to both of the standards was the loss of the left-hand gold stud, but whether this was caused by the action of the flames or otherwise is not known. When the Palace of Westminster was rebuilt the bars were deposited in the Journal Office, and from that time until recently they seem to have been wholly lost sight of. Some time ago it happened to be stated in the lobby that one of the duties of the speaker was to inspect once in every twenty years the standards immured in the sill of the lower waiting hall. Inquiries at the standards department of the Board of Trade elicited the fact that, so far from any statutory requirement being imposed upon the speaker in the direction indicated, Section 35 of the Weights and Measures Act, 1878, which provides for the care and restoration of the parliamentary copies of the imperial standards, specially exempts the walled-up copy from periodical inspection and comparison. It was found, however, that in 1871 Speaker Denison took cognizance of the standards; and this fact was brought to the speaker's notice. While inquiries were being made as to Speaker Denison's inspection, an official in the Journal Office mentioned that when the contents of that office were recently being transferred to the new wing he had observed among the lumber some old weights and measures. These proved to be the missing standards. They were examined by Mr. Chaney, the superintendent of weights and measures.

The most important of the standards thus rescued from oblivion are the yard measures constructed by Bird in 1758 and 1760. The former was copied from a bar in the possession of the Royal Society, which was itself a copy of a standard preserved in the Tower; and the second was constructed under the directions of a committee of the House of Commons from the 1758 standard. "Each of these two standard yards consisted of a solid brass bar 1.05 inches square in section and 39.73 inches long. Near each end of the upper surface gold pins or studs 0.1 of an inch in diameter were inserted, and points or dots were marked upon the gold to determine the length of the yard." The other standards in the custody of the Journal Office are two brass rods answering the description of the old exchequer yard, and four weights supposed to be certain of the "copies, model, patterns, and multiples" ordered by the House on May 21, 1760, "to be locked up by the clerk and kept by him." The most important weight — the standard troy pound — is not among those now brought to light.

INHALATIONS IN THE TREATMENT OF PHTHISIS.[1]

THE history of inhalations in the treatment of phthisis is not an encouraging one. They have been widely employed and hailed as the most rational and effective mode of assailing the disease at its seat. But the results of this method of medication have not been commensurate with the expectations excited by it, and we imagine that of late it has been gradually falling into disfavor and disuse. Several potent objections have been urged against the method. First, it has been denied that the various antiseptic and germicide agents applied by inhalation succeed even in reaching the seat of the disease — viz., the submucus tissue of the bronchial mucus membrane — but are arrested often in the pharynx, oftener still in the larynx. Then it has been shown that, even assuming that the medicated atmosphere produced by one of the ordinary inhalers really reaches the seat of the disease, its impregnation with carbolic acid, creosote, thymol, or other such agent, is so exceedingly feeble as to leave no solid ground for anticipating serious benefit from its use. Further, many authorities urge with much force that if the phthisical patient be taught to rely upon inhalations the inevitable result will be a life of indoor invalidism and constant tinkering with his inhalers, a mode of existence sure to effect an amount of mischief more than sufficient to counterbalance the problematical advantages of inhalation.

There is much weight in the above objections, and until they can be satisfactorily met, the place of inhalations in the therapeutics of phthisis can not be an important one. Professor Germain-Sée, in a recent paper presented to the French Academy of Medicine, has sought to overcome the first of the objections to which we have made allusion, viz., the failure of the medicated atmosphere to reach the actual seat of the disease. He recalls the researches made at various times into the action of creosote upon tuberculosis. This drug has had a remarkable and somewhat checkered career. Discovered in 1832 by Reichenbach, its true composition was first made known in 1853 by Gorup-Besanez, who showed that it consisted mainly of two substances, Gaïacol and créosol. It was in 1877 that Bouchard and Gimbert conceived the idea of its possible utility in phthisis, and made trial of it both *per primam viam* and hypodermically. Later, Fraenzel and Sommerbrodt in Germany made extensive trial of creosote, and reported benefit from its use.

Guttmann, in his researches in the year 1889, found that the saturation of the system with creosote arrested the development of the bacilli, and suggested that the best means of bringing the system thoroughly under the influence of the drug would be to submit the patient to an atmosphere saturated with creosote under pressure. This is also the method recommended by Professor Germain-Sée. He describes it as follows: "The patient is shut up in a metal chamber, hermetically closed, and compressed air, passed through creosote and eucalyptol, is made to enter slowly. The air in passing through these liquids is saturated, and arrives charged with a large quantity of these medicaments. The pressure must be slowly increased, and should not exceed a half atmosphere. The speed of delivery of the air saturated with the medicated vapors is from fifteen to twenty cubic metres per hour for a space of five cubic metres of capacity. The length of time the patient remains in the chamber is usually two hours, sometimes three or more, and no inconvenience ensues as the result of this procedure. The inhalations are made daily or more frequently."

Professor Germain-Sée has tried this method in twelve cases, of which one was a case of apical bronchitis, a second was a case of fœtid bronchitis, and the remaining ten were genuine cases of tubercular phthisis, all of which, with one exception, had arrived at the stage of softening. The results obtained appear to be surprising, a marked amelioration being in most cases observable, not only in the amount and character of the expectoration, but in the general constitutional condition, and in some cases, though not in all, a corresponding improvement in the physical signs. Contrary to what might seem probable, hæmoptysis was not only not excited, but seemed controlled by this mode of treatment, and the appetite and digestion were improved rather than otherwise. Hectic fever was also diminished. Naturally, the least improvement was manifested in the physical signs, but Professor Germain Sée is inclined to hope that by this new method the disease, if not cured, may at least be arrested, and further progress prevented. Benefit was obtained in some cases in a fortnight, in others the treatment was kept up for three months. Very great benefit was obtained in some cases of scrofulous enlargement of the cervical glands.

At the present time it is hardly necessary to emphasize the necessity for extreme caution in admitting the claims of any new alleged remedy for tuberculosis, and the evidence before us in the present case, although interesting, falls immeasurably short of demonstration. Further trials will no doubt be made, and the results will be awaited with attention. One benefit, somewhat negative in character, may even now be derived from Professor Germain-Sée's researches, viz., the realization of the utter futility of the methods of inhalation so long adopted, and the uselessness of the inhalers now commonly employed. If inhalation is ever to become a valuable agent in therapeutics, it will probably be by the adoption of some plan analogous to that sketched above, and, according to our present knowledge, the most hopeful medicament with which to experiment would seem to be creosote.

[1] From the London Lancet.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

Beech Trees and Lightning.

THE question was raised in *Science* a short time ago as to whether beech trees were ever struck by lightning. During a severe thunder-storm which passed over here this afternoon a beech tree

within fifty yards of the house was struck, the upper part of the trunk and several of the branches to the end being stripped of their bark, but the lower part of the trunk showing no sign of passage of the lightning. THOMAS DARLEY.

York, England, July 21.

That Hessian Fly Parasite.

THE item concerning the introduction of a European parasite of the Hessian-fly into this State which is going the rounds of the press, and which I notice you have copied in your issue of July 17, was unauthorized, and is in some respects inaccurate.

The parasites were not obtained originally from the Smithsonian Institution, but were sent me by Dr. Riley, the entomologist of the United States Department of Agriculture, several other entomologists, as I understand, having received them at the same time. This was, in short, an experiment of the Division of Entomology, and not my own.

The parasite is *Semiotellus nigripes*, and, like our native species of the same genus, infests the larva, not the egg.

S. A. FORBES.

Champaign, Ill., July 20.

Information Wanted.

CAN I learn through the columns of *Science* how to interpret the indications of the thermometer with bulb blackened and inclosed in an exhausted glass case?

Are there any accepted formulæ for this so-called solar radiation thermometer, and where can one find the literature of the subject? F. C. VAN DYCK.

New Brunswick, N.J., July 30.

BOOK-REVIEWS.

The History of Human Marriage. By EDWARD WESTERMARCK. New York, Macmillan. 8°. $4.

THIS is one of the most elaborate works on the history of social institutions that we have met with. The author is lecturer on sociology in the University of Finland at Helsingfors, yet his book was written by himself in English, which is to him a foreign language. He modestly tells us in his preface that, as originally written, the book contained some un-English expressions, which were corrected by his English friends; but the ease and clearness of the style show that he is a master of the art of expression, and make his work far more interesting than works on such subjects are apt to be. The word "human" in the title of the book is tautological; for there is no marriage known to us except the human, and Mr. Westermarck's attempt to show that the mating of animals is the same thing as marriage is by no means successful. Marriage is a moral institution, and therefore cannot exist except among moral beings; and Mr. Westermarck's failure to duly appreciate the moral aspects of his subject is the principal defect of his work.

As a descriptive history of marriage, however, in the many forms it has assumed, the work could hardly, in the present state of our knowledge, be surpassed. It opens with a discussion of the proper method to be pursued in this and similar inquiries, as to which the author is more prudent than some writers have been. He remarks that "nothing has been more fatal to the science of society than the habit of inferring without sufficient reasons from the prevalence of a custom or institution among some savage peoples that this custom, this institution, is a relic of a stage of development that the whole human race once went through" (p. 2). It was high time to sound this note of caution, and we trust that other inquirers into early history will give heed to it. Having settled on his method of investigation, Mr. Westermarck goes on to present the different phases of his subject, such as the antiquity of marriage, the hypothesis of promiscuity among primitive peoples, the influence of affection and sympathy, the forms of marriage, the ceremonies attending it, and many other matters pertaining to the marriage relation. He shows a very wide as well as intimate knowledge of the facts, so far as they have been discovered, and both his facts and his arguments will have to be considered by all who may write on the subject hereafter.

His opinions on certain fundamental points are at variance with those of most previous writers, and hence his work is likely to give rise to some controversy. He rejects the hypothesis that promiscuous intercourse was once everywhere prevalent, and his arguments on this point deserve careful attention. In some of his other theories he does not seem to us quite so fortunate. For instance, he maintains that there was in the earliest times a human pairing season similar to that of animals, the sexual passion being dormant the rest of the year; yet he brings no adequate evidence to support this view, and hardly any evidence at all. Again, in speaking of the prohibition of marriage among near kindred, he remarks that savages could hardly have known that such marriages are physically injurious to the race, and so he attempts to account for the prohibition by the principle of "natural selection." He thinks that "there was no doubt a time when blood relationship was no bar to sexual intercourse. But variations, here as well as elsewhere, would naturally present themselves; and those of our ancestors who avoided in-and in breeding would survive, while the others would gradually decay and ultimately perish" (p. 352). But what we want to know is why some of our ancestors avoided such breeding while others did not; and it is no answer to this question to tell us that, after the two customs had been established, the one prevailed over the other. But whatever may be thought of some of Mr. Westermark's theories, his work will be indispensable to all students of the early history of mankind.

Justice. By HERBERT SPENCER. New York, Appleton. 12°. $.25.

THIS is intended to form the fourth part of Mr. Spencer's "Principles of Ethics," of which only the first part had previously appeared. Only the earlier chapters of the book deal with the general principles of justice, the bulk of it being devoted to their application. We cannot say that in our opinion the work is a success, the author's fundamental ideas being vague and inconsistent. His attempt to show that there is such a thing as "animal ethics" is hardly worth discussing; but when he comes to treat of human justice he lays down as its fundamental principle a proposition which will meet with little acceptance from philosophers. He maintains that "each individual ought to receive the benefits and the evils of his own nature and consequent conduct; neither being prevented from having whatever good his actions normally bring to him, nor allowed to shoulder off on to other persons whatever ill is brought to him by his actions" (p. 17). Now according to this rule, if a man in consequence of his own mistake meets with an accident that disables him, it is just for other men to leave him to perish; but most people would say it was unjust.

Mr. Spencer afterward modifies this principle somewhat by the provision that no man shall interfere with the freedom of others; and thus he reaches what he calls "the formula of justice," which is as follows: "Every man is free to do that which he wills, provided he infringes not the equal freedom of any other man" (p. 46). This is a familiar principle of the common law; and it is rather surprising to see it presented in this work as if it was something novel. It is by no means sufficient, however, as a universal rule of justice, as Mr. Spencer himself finds when he comes to deal with the rights of children; for if children were left to themselves merely, without help or interference from older persons, they would die. Accordingly Mr. Spencer falls back upon another principle, namely, the necessity of preserving the species, which makes it the duty of the parents to support and protect their offspring. Thus he lays down two quite distinct principles of justice, and he nowhere takes the trouble to reduce them to one nor to show how they are to be reconciled with each other. He fails, too, as all the associationists have failed, to account for moral obligation. Why should I refrain from infringing the freedom of others if it happen to be for my advantage to infringe it? and why am I bound to preserve the species? Mr. Spencer scarcely touches this question in the body of his

work, but in the appendix he gives a few words to the subject in reply to a critic; yet he shows but a vague conception of what the problem is, and fails as completely as Mill did to solve it.

From the nature of Mr. Spencer's "formula of justice" it will be inferred that his work relates mainly to legal and political justice, and this is the case. Having obtained his formula, he proceeds to deduce from it the principal legal rights that men enjoy in civilized society, such as the right to physical integrity, the right of property, the right of free motion and locomotion, the right of free speech, etc.; and though his deduction is not in all cases quite satisfactory even to himself, it is in the main a success, except, as above stated, in the case of children. He next proceeds to deal with the constitution and functions of the state, and devotes several chapters to a reiteration of his views on the proper limits of state interference with the liberty of the individual, but without presenting anything new. Mr. Spencer's work will be welcomed by those who agree with his extreme individualistic views; but we doubt if it will contribute much to the ethics of the future.

AMONG THE PUBLISHERS.

THE J. B. Lippincott Company, Philadelphia, announce as in press "The Natural History of Man, and the Rise and Progress of Philosophy," a series of lectures delivered by Alexander Kinmont, A.M.

— Professor Arthur Sherburne Hardy has gone abroad for a year, and may, perhaps, go round the world.

— Professor Lyon G. Tyler of William and Mary College has in contemplation a political history of Virginia, for which he has already accumulated a large amount of material.

— H. H. Johnston is writing a book on Livingtone and Central African exploration, which will be illustrated from original drawings by Mr. Johnston and from photographs.

— "I desire to enter a plea for the child," says Henry Sabin in his book, "Organism and System" (Bardeen); "to recall the almost forgotten fact that the supreme object of the child's education is the child himself. Organization and system are but means to an end. 'What is the machine for?' finds its answer in the value of the product."

— The article upon "University Extension and its Leaders," which Professor Herbert B. Adams of the Johns Hopkins University prepared for the July number of the *Review of Reviews*, has been honored by receiving the first prize offered by the regents of the University of New York for an article upon university extension. The English edition of the *Review* last year offered a prize of $1,500 as a three-year college scholarship to the English girl who should pass the best examination in contemporary history and politics, the examination to be based upon articles and discussions appearing in the *Review* from January to December, 1890, inclusive. The award has recently been made, and in the American edition of the *Review* for August there appears an account of the prize and its award, together with portraits of the two young ladies between whom the first prize was divided, and of two others who won the second and third prizes. The "Progress of the World," in the August number, opens with a discussion of Chicago and the World's Fair, from the pen of Dr. Albert Shaw.

— The recent issues of the "Papers of the American Historical Association" contain some articles of interest. The double number for January and April has a paper by Mr. John Jay on the "Demand for Education in American History," in which he presents the well-known arguments for the necessity of such education, but without adding anything new. Mr. Charles M. Andrews discusses "The Theory of the Village Community" in a way that will not be gratifying to the school of Freeman and Maine; for he shows their views as the democratic constitution of the early communities has no real basis in fact and very little support from analogy. Mr. W. H. Mace has an article on the "Organization of Historical Material," which will doubtless be suggestive to young historians, though it contains nothing specially novel. There is also an interesting paper on Bismarck's career, with others on various topics. The July number contains a long and elaborate account of "The Fate of Dietrich Flade," who was a judge in the Rhenish town of Trier, and was put to death in 1589 for the then heinous crime of witchcraft. Professor Burr in this article, however, makes it pretty certain from newly discovered evidence that Flade's death was really due to the malice of his personal enemies. This number also has articles entitled "The Philosophic Aspects of History" and "Is History a Science," neither of which sheds much light on the subject, and closes with a paper by Mr. J. G. Bourinot on "Canada and the United States," in which the author takes strong ground against annexation. The "Papers" are published by Putnam at four dollars a year.

— Messrs. Macmillan & Co. announce that they are now issuing a new edition of "The Cambridge Shakespeare." This well-known text was originally published in 1863–6. It has been for many years out of print, and second-hand copies have only been procurable at high prices. A new and revised edition has long been contemplated, but has been postponed in order that Mr. W. Aldis Wright (the surviving editor) might go carefully over the whole work in the light of the most recent textual criticism of Shakespeare. This has now been done, and it is hoped that the Cambridge edition, which may now be considered as in its final form, may be found most satisfactory.

— Messrs. Funk & Wagnalls, publishers, announce that their new "Standard Dictionary of the English Language" will probably be issued early in 1892. In a recent presentation of the plan of the work, now well under way, the publishers state that it will embody many new principles in lexicography, and will contain nearly twenty-two hundred folio pages, with over four thousand illustrations made expressly for it. It will contain some two hundred thousand words. Among the hundred or more editors on the staff of the new dictionary we find the names of Professors F. A. March, Simon Newcomb, N. S. Shaler, W. B. Dwight, Thomas H. Huxley, E. E. White, F. Max Müller, and Daniel G. Brinton; also Otis T. Mason, Dr. T. Mitchell Prudden, Rear-Admiral Luce, Gen. O. O. Howard, Benson J. Lossing, Hon. Carroll D. Wright, Anton Seidl, Henry M. Stanley, H. H. Bancroft, Robert Grimshaw, Alfred Ayres, and Alexander Graham Bell. Among the chief distinguishing characteristics of the work, as set forth in the prospectus, are the following. In the definition of a word the most common meaning is given first, preference being given to the "order of usage" over the historical order; for showing the pronunciation a "scientific alphabet" is used, which has been prepared and recommended by the American Philological Association and the American Spelling Reform Association; disputed pronunciations and spellings are referred to a committee of fifty leading philologists, writers, and speakers; a committee of five representative scholars will pass upon all new words admitted; strictly obsolete and dialectic words, and such foreign words as are rarely used, are placed in a glossary in the appendix; handicraft terms are grouped under the various trades, the more important being also given in their vocabulary places. The German double hyphen is used in compound words; and the different parts of each science are so treated that the student can easily trace the definition of all its branches, and have before him the full meaning of the science; that is, while the terms belonging to each branch or subordinate branch of a science are defined in their proper vocabulary places, the references to their superior and subordinate branches are so given that the definition of the science as a whole can easily be traced and collected, and when so collected will be found by the student to be a full and harmonious exposition of the entire science.

— From Allyn & Bacon, publishers, Boston, we have received "Primary Batteries," a well arranged and practical little volume of nearly two hundred pages, by Henry S. Carhart, A.M., professor of physics in the University of Michigan. Notwithstanding the many works on electrical topics that have made their appearance in the past few years, the particular branch of the subject covered by Professor Carhart's book has been comparatively neglected, the

only work devoted wholly to primary batteries available to English-speaking electricians and students, we believe, having been an unsatisfactory treatise translated from the French. In preparing this book the author has evidently had in mind the needs of the student of electricity as well as of those whose occupation requires some degree of familiarity with primary batteries for practical purposes, as the work is admirably adapted to the wants of both classes. The divisions of the subject appear to be as logical as the nature of the material permits, each being fully illustrated by the most useful types of cells. Prominence has been given to standards of electromotive force, and a chapter is devoted to testing, which will prove both interesting to the student and useful as a laboratory guide.

— Professor Tyndall's health is improving to such an extent that he is preparing for the press a volume of essays, addresses, and reviews, to be issued under the title "Fragments of Science."

— Ginn & Co., publishers, announce for immediate publication "The Story of Our Continent," a reading book in the geography of North America, by professor N. S. Shaler of Harvard University, illustrated. The object of this book is to set before the student a simple explanation of the way in which the continent of North America has come to its present physical state, and at the same time to show how this physical state affects the life of the people. In other words, it seeks to secure a clear conception of the geography of the continent by showing in a very simple manner the geological evolution of its features. It is adapted to the needs of grammar schools, and may advantageously be used as a reader in connection with a regular text-book in geography. As an introduction, by the way of our own continent, to the study of geology and physical geography, it will be found to possess a peculiar value.

— *The Climatologist* is the title of a new monthly journal of medicine announced by W. B. Saunders, 713 Walnut Street, Philadelphia. The object of this journal will be to promote original investigation, to publish papers containing the observations and experience of physicians in this country and Europe on all matters relating to climatology, mineral springs, diet, preventive medicine, race, occupation, life insurance, and sanitary science, and in that way to supply the means by which the general practitioner and the public at large will become better acquainted with the diseases of this country and Europe, and better armed to meet the requirements of their prevention or cure. The editors are Drs. John M. Keating, F. A. Packard. and Charles P. Gardiner, who will have the co-operation of about thirty associate editors. The first issue, dated August, will be ready about the 10th.

— According to the *Publishers' Weekly*, Professor Lester F. Ward has received the distinction of having his book, "Dynamic Sociology," burned by order of a council of ministers of Russia.

Publications received at Editor's Office,
July 22–Aug. 4.

ALLSOP, F. C. Telephones, their Construction and Fitting. New York, Spon. 191 p. 12°. $2.
COMSTOCK, T. B. Report on the Geology and Mineral Resources of the Central Mining Region of Texas. Austin, State. 100 p. 4°.
CUMMINS, W. T. Report on the Geology of Northwestern Texas. Austin, State. 94 p. 4°.
HYATT, A. Carboniferous Cephalopods. (Geol. Survey of Texas.) Austin, State. 30 p. 4°.
MAINE. Sixth Annual Report of the State Board of Health of the State of, 1890. Augusta, State. 306 p. 8°.
PETERMAN, A. L. Elements of Civil Government. New York, American Book Co. 218 p. 12°. 60 cents.
SPENCER, Herbert. Justice; being Part IV. of the Principles of Ethics. New York, Appleton. 291 p. 8°. $1.25.
STREATFEILD, F. W. Practical Work in Organic Chemistry. New York, Spon. 156 p. 12°. $1.25.
TEXAS, Geological Survey of. Reports on the Iron Ore District of East Texas. Austin, State. 326 p. 4°.
TEXAS, Second Annual Report of the Geological Survey of. Austin, State. 109 p. 4°.
U. S. GEOLOGICAL SURVEY. Topographical Maps of Portions of Alabama, Georgia, Illinois, Kansas, Kentucky, Maryland, Massachusetts, New Hampshire, New Jersey, North Carolina, Pennsylvania, Tennessee, Vermont, Virginia and West Virginia. Washington, Government. 15 maps. f°.
UNIVERSITY Extension. Vol. I., No. 1. *m.* July, 1891. Philadelphia, Am. Soc. for the Extension of Univ. Teaching. 32 p. 8°. $3 a year.
VON STREERNWITZ, W. H. Report on the Geology and Mineral Resources of Trans-Pecos Texas. Austin, State. 70 p. 4°.
WESTERMARCK, E. The History of Human Marriage. New York, Macmillan. 644 p. 8°. $4.

A Russian writer, Nicholacy, had obtained permission to translate the work, and the publisher Soldatenkoo had printed and published 1,200 copies of the first volume when the order for its confiscation and *auto-da-fé* was given. The publisher's loss will be over 3,000 roubles. Of course he will not attempt to publish the second volume, and it is more than likely that the manuscript will be seized and destroyed. Professor Ward thinks that the chapter advocating universal education may have been the cause of the Russian censor's objection to the book.

— The *Home Journal* of last week contained a four-column article which expounds and explains the important question of international copyright. It shows how the new law affects authors, publishers, printers, and readers on both sides of the Atlantic.

— There is in the London *Journal* of January, 1891, this reference to the establishing of the university extension movement in Austria: "A beginning has recently been made in connection with the Vienna universities and the 'Volksbildungs' (Society for Popular Instruction) to introduce the university extension system to the Austrian capital. Dr. Bauer, who visited this country in the summer, writes that a society has been formed, under the auspices of which courses of lectures have already been arranged in science, history, and economics, in various parts of the city, and on the eve of the coming census a series of lectures will be given on the 'Statistics of Population.' Lecturers have also been asked to give courses to the soldiers and officers in barracks. The majority of teachers are graduates of the university, or men of acknowledged literary or scientific training, and the work is thus of university stamp." The financial difficulty has quickly asserted itself, and it is proposed to apply for aid to the "Lantag" (provincial parliament), and any grant that may be forthcoming will be controlled by a "curatorium," consisting of certain members of parliament, professors of the university, and members of the society.